

Chapter 4. Physical Resources Management

4.1 Integrated Training Area Management (ITAM)

Army training is designed to challenge soldiers, leaders, and units. As the Department of Defense's (DOD) premiere land force, the Army relies on land to achieve its training and testing objectives and maintain force readiness. Force readiness depends on high-quality realistic training. Not surprisingly, the use of these lands for training and testing purposes causes damage that can potentially reduce the quality of training on these lands. It is in overcoming the apparent conflict between force readiness and stewardship that ITAM serves the overall needs of the Army.

There are four components of the ITAM program. These four components work in unison to accomplish the ITAM mission:

- Land Condition Trend Analysis (LCTA)
- Training Requirements Integration (TRI)
- Land Rehabilitation and Maintenance (LRAM)
- Environmental Awareness (EA).

4.1.1 ITAM Goals and Objectives

ITAM is a key part of the Army's commitment to environmental stewardship. Four of the Chief of Staff of the Army's goals serve as the foundation for official ITAM policy. ITAM goals and objectives all contribute to one or more of the overall natural resources program goals of stewardship, military training support, compliance, quality of life, and integration. The four Army-wide ITAM goals are listed below:

- Integrate environmental planning procedures into all operations.
- Protect natural and cultural resources.
- Ensure operations comply with environmental standards and receive no notices of violation or fines for noncompliance.
- Prevent future pollution and reduce hazardous waste and toxic releases.

The ITAM program is the Army's formal strategy for focusing on sustained use of training and testing lands. The intent of the ITAM program is to systematically provide a uniform training land management capability across the total Army. The Army will manage its lands in a sound manner to ensure no net loss of training capabilities and to support current and future training and mission requirements. The effective integration of stewardship principles into training land and conservation management practices ensures that the Army's lands remain viable to support future training and mission requirements.

ITAM establishes a systematic framework for decision-making and management of Army training lands. It integrates elements of operational, environmental, master planning, and other programs that identify and assess land use alternatives. The ITAM program also supports sound natural and cultural resources management practices and stewardship of land assets, while sustaining those assets in support of training, testing, and other installation missions.

The goals of the USARAK's ITAM program are as follows:

- Achieve optimal sustained use of lands for the execution of realistic training by providing a sustainable core capability, which balances usage, condition, and level of maintenance.

- Implement a management and decision-making process, which integrates Army training and other mission requirements for land use with sound natural and cultural resources management.
- Advocate proactive conservation and land management practices.
- Align Army training land management priorities with the Army training, testing, and readiness priorities.

USARAK intends to employ the following objectives to meet ITAM program goals by determining the capacity of the land to:

- Sustain training and testing through diagnostic methods, models, and tools.
- Support assignment of the optimum type, frequency, duration and intensity of training and testing that can be conducted on a given parcel.
- Identify the risks and costs associated with exceeding the capacity of the land.
- Allocate training land uses, including the type, frequency, duration and intensity of use, based on the capacity of the land to sustain those uses.
- Support sustained use of land by planning, programming, and executing repair and maintenance projects and by reconfiguring and redesigning training and testing areas to meet recognized requirements.
- Educate users to prevent avoidable damage to the land and minimize unavoidable damage resulting from training, testing, and other mission activities.
- Establish a defined land condition baseline for natural and cultural resources that will be maintained through ITAM and is relevant to the installation environmental setting and mission activity.
- Monitor land and natural resources conditions and determine trends in those conditions.
- Stabilize and sustain natural and cultural resources conditions by changing type, frequency, duration, or intensity of use, or by applying adjusted levels of repair and maintenance.
- Increase understanding of Army mission training requirements by educating environmental and natural resources personnel.

4.1.2 ITAM Planning – Training Requirements Integration (TRI)

Description and Justification: TRI is a decision support procedure that integrates all requirements for land use with natural and cultural resources management processes. TRI integrates the installation training and testing requirements for land use derived from the Range and Training Land Program (RTLTP); the range operations and training land management processes; and the installation training readiness requirements with the installation's natural resources conditions. The Army Training and Testing Area Carrying Capacity (ATTACC) program is the standard ITAM methodology for estimating training land carrying capacity by relating training load, land condition, and land maintenance practices. The integration of all requirements occurs through continuous consultation among the Directorate of Plans, Training, and Mobilization (DPTM), natural and cultural resources managers, and other environmental staff members. The output of the TRI process is incorporated in the installation's Integrated Natural Resources Management Plan (INRMP).

TRI supports the Army's requirements for environmentally sustainable training lands. TRI improves coordination and facilitates cooperation, decision-making, and allocation by providing uniform information regarding land conditions, trends, and any necessary modification of requirements. The TRI goals are achieved when training, testing, and environmental requirements are balanced in the decision-making process. The Sikes Act requires “no net loss” in the capability of military lands to support the military mission.

Measures of Effectiveness:

- Ensure sustained accessibility to adequate training lands to support training to standards under realistic natural condition
- Provide military trainers and land managers with the necessary technical and analytical information to make good decisions.
- Integrate doctrinally based training and testing with land constraints
- Quantify training land carrying capacity.
- Reduce the number of Notices of Violation resulting from military maneuver training.

Management History: TRI was first implemented at Fort Greely and Donnelly Training Area in 1997. ITAM and natural resources personnel have been co-located with Range Control at Fort Greely and Donnelly Training Area, ensuring effective integration of natural resources and military requirements.

Current Management: TRI supports the Army's requirements for environmentally sustainable training lands. TRI improves coordination and facilitates cooperation, decision-making, and allocation by providing uniform information regarding land conditions, trends, and any necessary modification of requirements. The TRI goals are achieved when training, testing, and environmental requirements are balanced in the decision-making process. The Sikes Act requires "no net loss" in the capability of military lands to support the military mission. TRI includes coordination of use and restrictions needed to maintain quality training land. TRI is currently approved and funded through 2002. Unless this INRMP is approved and funded, TRI will cease in 2003.

Proposed Management:

Table 4-1. Training Requirements Integration.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Integrate training and testing requirements with training land management into a prioritized ITAM workplan, and execute requirements subject to availability of resources.	USARAK ITAM	Medium	x	x	x	x	x
Optimize training land management decisions by coordinating mission requirements and land maintenance activities with training and testing land carrying capacity.	USARAK ITAM	Medium	x	x	x	x	x
Identify existing and projected training land resources and prioritized land use requirements.	USARAK ITAM	Medium	x	x	x	x	x
Generate prioritized requirements for land rehabilitation, repair, and/or reconfiguration	USARAK ITAM	Medium	x	x	x	x	x

Other Management Alternatives Considered and Eliminated: There are other potential methods of managing training lands and scheduling to minimize disturbance. However, other methods would be either inadequate or cost-prohibitive.

4.1.3 ITAM Monitoring – Land Condition Trend Analysis (LCTA)

Description and Justification: Land Condition Trend Analysis (LCTA) is the component of the ITAM Program that provides for the collecting, inventorying, monitoring, managing, and analyzing of tabular and spatial data concerning land conditions on an installation. LCTA provides data needed to evaluate the capability of training lands to meet multiple use demands on a sustainable basis. It incorporates a relational database and GIS to support land use planning decision processes. LCTA collects physical and biological resources data to relate land conditions to training and testing activities. These data are intended to provide information to effectively manage land use and natural resources.

Management Areas: LCTA maps land use on Fort Greely and Donnelly Training Area. There are three general land uses on the Fort Greely and Donnelly Training Area installation that can be described as (1) urban areas, (2) impact areas, and (3) training areas. Training areas are further delineated into primary land uses, such as maneuver areas, bivouac areas, foot-use, road rights-of-way, firing points, firing ranges, etc. and secondary land use, such as gravel pits, recreation areas, campgrounds, wildlife habitat cuts, rights-of-way, etc. Land use categories are described in Table 4-2.

Table 4-2. LCTA Monitoring Areas.

LCTA Monitoring Areas	Monitoring Intensity	Monitoring Frequency	Number of Sampling Points Completed as of September, 2000	Size
Maneuver Areas	High	Annually	358	888 acres
Bivouac Areas	High	Annually	1,220	2,616 acres
Foot Use Areas	Low	Once every 5 years	3,020	468,695 acres
Drop Zones	Medium	Once every 3 years	325	7,413 acres
Firing Ranges	Medium	Once every 3 years	30	350 acres
Firing Points	High	Annually	83	90 acres
Airstrips	Low	Once every 3 years	0	651 acres
Road Corridors	Low	Once every 5 years	0	336 acres
Rights-of-way	Low	Once every 5 years	0	151 acres
Excavations	Low	Once every 3 years	0	13 acres

Management History: LCTA was implemented on Fort Greely and Donnelly Training Area in 1997 utilizing Alaska LCTA methods.

Measures of Effectiveness:

- Determine the condition of the land and its ability to support military training
- Identify and recommend land rehabilitation and maintenance priorities.
- Identify areas degraded due to erosion and recommend erosion control repair priorities.
- Identify wetlands disturbance and recommend reclamation priorities.

- Provide information that may affect force structure and stationing decisions at MACOM and DA levels.

Current Management: USARAK currently conducts LCTA monitoring on approximately one-fifth of the portion of Fort Greely and Donnelly Training Area that is east of the Delta River per year. LCTA is currently approved and funded through 2002. Unless this INRMP is approved and funded, LCTA monitoring will cease in 2003.

Proposed Management:

Table 4-3. Land Condition – Trend Analysis.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Conduct annual LCTA monitoring on Fort Greely and Donnelly East and West Training Areas and Gerstle River Training Area.	USARAK ITAM	Medium	x	x	x	x	x
Conduct annual LCTA data analysis and management.	USARAK ITAM	Medium	x	x	x	x	x
Prepare annual LCTA report.	USARAK ITAM	Medium	x	x	x	x	x

Other Management Alternatives Considered and Eliminated: There are many other potential methods of monitoring training lands to determine land condition. However, Alaska Region LCTA methods were developed specifically for the Alaskan ecosystems, with the specific purpose in mind of assessing land condition in terms of its usefulness for military training. Other methods could be developed that include collecting data at many more points per year, but these would be cost-prohibitive.

4.1.4 ITAM Management

4.1.4.1 Land Rehabilitation and Maintenance (LRAM)

Description and Justification: LRAM is a preventive and corrective land rehabilitation and maintenance procedure that reduces the long-term impacts of training and testing on an installation. It mitigates training and testing effects by combining preventive and corrective land rehabilitation, repair, and/or maintenance practices. It includes training area redesign and/or reconfiguration to meet training requirements.

LRAM uses technologies such as re-vegetation and erosion control techniques to maintain soils and vegetation required to support the military mission. These specifically designed efforts help installations maintain quality military training lands and minimize long-term costs associated with land rehabilitation or additional land purchases. LRAM includes programming, planning, designing, and executing land rehabilitation, maintenance, and reconfiguration projects based on requirements and priorities identified in the TRI and LCTA components of ITAM.

Management Areas: Management areas are the same for LRAM as for erosion control. At Fort Greely and Donnelly Training Area, a rotational system of erosion control and LRAM will be used. East of the Delta River, erosion control and LRAM repairs will be focused on repair in Op and Greely training areas in 2003, Jarvis East and Jarvis North training areas in 2004, Ober and Donnelly training areas in 2005,

and Butch and Granite training areas in 2006. Erosion and LRAM repair will be conducted as needed in West Donnelly Training Area (Figure 4-1).

Measures of Effectiveness:

- Sustain long-term training and testing on lands held under the stewardship of the US Army.
- Sustain the overall condition of installation lands to ensure long-term military viability of its installations.
- Increase mobility, access, and availability within and between training areas.

Management History: Since 1997, a number of LRAM projects have been completed on Fort Greely and Donnelly Training Area. Clean up of sub-training area 58, part of Bolio Training Area at Fort Greely and Donnelly Training Area, entailed removing over 500 pounds of concertina wire from the training area. Jarvis West Training Area access was repaired during 1999. This project improved access and increased availability of bivouac areas in Jarvis West Training Area. The Bondsteel Range access improvement upgraded the existing trail into the Bondsteel Range to allow access year-round. In 2000, the Staging Area in Bolio Training Area on Fort Greely and Donnelly Training Area was hardened, and access throughout east Fort Greely and Donnelly Training Area was improved by upgrading phase 1 of 33-Mile Loop Road.

Current Management: USARAK attempts to repair approximately ten percent of degraded sites on Fort Greely and Donnelly Training Area per year, as well as improving sites for military use. Types of LRAM projects include repairing degraded land, improving access into training areas, hardening bivouac areas, and repairing ranges. Ongoing projects include those projects funded late in 2001 but not projected to be completed until 2002. If this INRMP is not approved and funded, LRAM projects will cease after 2002.

Proposed Management:

Table 4-4. Land Rehabilitation and Maintenance.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Harden approaches to Delta River fording site.	USARAK ITAM	High	X				
Harden approaches to Jarvis Creek fording site.	USARAK ITAM	High	X				
Open up bivouac sites along 33-Mile Loop Road.	USARAK ITAM	High	x				
Harden Firing Point Big Lake.	USARAK ITAM	High	x				
Upgrade 33-Mile Loop Access, Phase 3.	USARAK ITAM	High	x				
Prescribed Burn, Lakes Impact Area.	USARAK ITAM	High		x			
Upgrade 33-Mile Loop Access, Phase 4.	USARAK ITAM	High		x			
Upgrade 33-Mile Loop Access, Phase 5.	USARAK ITAM	High			x		
Upgrade 33-Mile Loop Access, Phase 6.	USARAK ITAM	High				x	

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Harden Donnelly Drop Zone Bivouac Area.	USARAK ITAM	High				x	
Upgrade 33-Mile Loop Access, Phase 7.	USARAK ITAM	High					x
Obtain necessary NEPA, Section 106 and CWA Section 404 permits	USARAK ITAM	High	x	x	x	x	x
ADF&G review of all streambank stabilization projects	USARAK ITAM	High	x	x	x	x	x

Other Management Alternatives Considered and Eliminated: There are many other potential sites for repair and maintenance on Fort Greely and Donnelly Training Area. However, less than ten percent of the total number of sites that are degraded can be fixed per year because of cost limitations. Repairing fewer than the number of site listed above can lead to poor water quality and may result in degradation of the military mission.

4.1.4.2 Environmental Awareness (EA)

Description and Justification: EA is the component of ITAM that fosters a conservation ethic in military personnel. EA consists of the following three elements: training/education materials, an implementation plan for awareness training, and command emphasis. EA consists of the development of a videotape production, soldier handbooks, soldier field cards, and posters focused on maneuver damage prevention. The videotape, which is shown to all soldiers during in-processing and at Range Control safety briefings, focuses on prevention of maneuver damage. The handbook includes a summary of restrictions on training to preserve the quality of training lands as well as a map showing areas with special environmental considerations. The videotape, handbooks, and soldier field cards were all developed in conjunction with Fort Greely and Donnelly Training Area's Environmental Awareness program. EA provides a means to educate land users on their environmental stewardship responsibilities. It provides for the development and distribution of educational materials to land users. These materials relate the principles of land stewardship and the practices of reducing training and/or testing impacts. EA also includes information provided to environmental professionals concerning operational requirements.

The Sikes Act requires "no net loss" in the capability of military lands to support the military mission. EA supports this compliance goal by reducing maneuver damage, reducing long-term maintenance costs for repair of training lands, and improving operational security skills. When land users practice environmental stewardship in the field, they are also achieving Army mission objectives. The EA program provides the land users with an understanding of how mission, training, testing, and other activities impact the land's capacity for sustaining a realistic training environment. EA also educates land users on how their land use affects the resident wildlife and vegetation.

Measures of Effectiveness:

- No net loss in the capability of Fort Greely and Donnelly Training Area to support the military mission.
- Decrease the number of Notices of Violation and fines as a result of military training.
- Minimize the amount of maneuver damage.
- Educate land users of their environmental stewardship responsibilities.
- Conduct operational awareness for environmental professionals.
- Brief at least 60 soldiers in at least two pre-command briefings per year during 2002-2006.

- Pass out a minimum of 500 handbooks and 1000 field cards per year during 2002-2006.
- Brief a minimum of 1000 soldiers in range safety briefings and pre-exercise briefings per year.

Management History: Fort Greely and Donnelly Training Area's EA program was initiated in 1997 and was fully implemented by 1999.

Current Management: USARAK actively works to educate soldiers to minimize damage and reduce waste both in the cantonment area and in the training areas. USARAK briefs EA during range safety meetings, pre-command courses, and pre-exercise classes. At these classes, current EA materials, such as field cards and handbooks, are passed out. In addition, each soldier is required to have either a handbook or a field card with them during major field exercises. These actions will continue throughout 2002-2006. However, if this INRMP is not approved and funded, no new materials will be developed and reproduced.

Proposed Management:

Table 4-5. Environmental Awareness.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Brief EA during range safety briefings, pre-command course classes, and pre-exercise briefings.	USARAK ITAM	High	x	x	x	x	x
Distribute up-to-date EA handbooks and soldier cards.	USARAK ITAM	High	x	x	x	x	x
Update EA handbook and field cards in 2003.	USARAK ITAM	High		x			
Update EA video in 2004.	USARAK ITAM	High			x		
Develop ITAM web page by 2003	USARAK ITAM	High		x			

Other Management Alternatives Considered and Eliminated: There are many potential options for educating soldiers and civilians in damage reduction when out in the training areas. However, the current methods have been developed to be most effective for reaching the appropriate audience. A lower level of effort could lead to greater environmental damage and possible fines for non-compliance. A greater level of effort would be cost-prohibitive.

4.1.5 ITAM Responsibilities

4.1.5.1 Department of Army

ODCSOPS, DAMO-TRS is the HQDA functional proponent with overall responsibility for the Army-wide ITAM program. It develops, provides, and integrates policy for and funds the ITAM program. The Office of the Assistant Chief of Staff for Installation Management – Office of the Department of Environmental Programs (OACSIM-ODEP) develops and provides conservation policy in support of the ITAM program. The COC provides executive-level oversight of the ITAM program; approves policy and support requirements; and makes recommendations to the Director of Training, as required. TRADOC-ATSC is the ITAM Executive Agent and focuses on user requirements; staff support of policy formulation; and training support to MACOMs and installations. U.S. Army Environmental Center provides and manages environmental technical support. The ITAM Installation Steering Committee plans

and executes the ITAM annual workshop and conveys installation-level input for achieving improvements to the ITAM program. The CCB provides management oversight of ITAM technological requirements through identification, development, and implementation.

4.1.5.2 U.S. Army Pacific

USARPAC develops, provides, and integrates ITAM policy to USARAK; provides management oversight; and represents USARAK's needs to executive ITAM program management organizations.

4.1.5.3 U.S. Army Alaska

The ITAM program links the efforts of the DPTSM, who has responsibility for installation training land management, with the efforts of the DPW and the natural and cultural resources/environmental staffs to support the overall objectives of sustaining a well-trained and equipped combat force.

Directorate of Plans, Training, Security, and Mobilization: The DPTSM establishes ITAM program priorities and policies and manages the overall ITAM program in USARAK. The DPTSM oversees ITAM funding provided to USARAK, submits an annual workplan reflecting ITAM requirements, provides user requirements input to USARPAC, submits technical support requests, submits execution reports. DPTSM also provides training and other mission land use data to the environmental management staff.

Directorate of Public Works: Executing the USARAK ITAM program (according to DPTSM priorities and policies) is the responsibility of the DPW. DPW coordinates all ITAM-related maintenance, repair, and facility management work and prepares and submits an annual workplan reflecting ITAM requirements to the DPTSM.

4.2 Watershed Management

4.2.1 Watershed Management Goals and Objectives

Watershed management goals and objectives all contribute to one or more of the overall natural resources program goals of stewardship, military training support, compliance, quality of life, and integration. AR 200-1 establishes the following objectives for water resources on Army lands:

- Conserve all water resources.
- Control or eliminate sources of pollution to surface or groundwater through conventional or innovative treatment systems.
- Demonstrate leadership in attaining the national goal of zero discharge of water pollutants.
- Provide drinking water that meets applicable standards.
- Cooperate with federal, state, and local regulatory authorities in forming and implementing water pollution control plans.
- Control or eliminate runoff and erosion through sound vegetative and land management practices.
- Consider nonpoint source pollution abatement in all construction, installation operations, and land management plans and activities.

Attainment of most of the above objectives is not the responsibility of Army natural resources programs, but some of them, especially the first and last two, are clearly natural resources management concerns.

Erosion has not been identified as a significant threat to water quality. Munitions explosions and associated wildfires cause soil disturbance, which increases the risk of significant erosion.

4.2.2 Watershed Management Planning

Watershed program management and planning includes all the planning, budgeting, overseeing contracts, and organization necessary to implement the watershed management program. The primary emphasis for this component of the watershed management program is to prepare and update the soil resources management plan and the soil and water quality monitoring protocol.

4.2.2.1 Soil Resources Management Plan

Description and Justification: Prepare, update, and implement a soil resources management action plan for Fort Greely and Donnelly Training Area. The soil resources management action plan will contain information on the location, extent, and severity of erosion sites as well as detailed scopes of work necessary to repair the sites. This plan is required to correct active erosion sites near sensitive areas such as streams and wetlands. This plan is required to stay in compliance with the Clean Water Act and the Sikes Act which requires “no net loss” in the capability to support the military mission of Fort Greely and Donnelly Training Area. Updates of the soil resources management plan are required by Public Law 106-65 (Military Land Withdrawal Act) as mitigation for the land withdrawal LEIS and Public Law 86-797 (Sikes Act) every five years to implement the INRMP. Per Memorandum DAIM-ED-N, 21 March 1997, this component of the INRMP is a class 1 requirement.

Measures of Effectiveness:

- Complete, update, and maintain the soil resources management plan
- Effectively protect soils while allowing military use.
- Involve the agencies in soil resources planning and the public in review.

Management History: The first soil resources management action plan was completed in 2001 by Gene Stout and Associates. Earlier planning and scoping for erosion control projects was completed in 1998 and 1999 by Alaska DNR Plant Materials Center.

Current Management: Current management actions to update the soil resources management plan will cease in 2002. If this INRMP is not approved and funded, no new soil resources management plan will be prepared, updated, or implemented. Policies already in place in the current soil resources management plan will continue.

Proposed Management:

Table 4-6. Soil Resources Management Plan.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Conduct annual updates of the soil resources management action plan	USARAK Natural Resources	High	x	x	x	x	x
Prepare and update soil resources management action plan for the planning period of 2007-2011.	USARAK Natural Resources	High					x

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Complete NEPA documentation for update	USARAK Natural Resources	High					x

Other Management Alternatives Considered and Eliminated: There are no alternatives to maintaining a current soil resources management plan in terms of updates at least every five years. NEPA documentation is also legally mandated.

4.2.2.2 Soil and Water Quality Management Plan

Description and Justification: Prepare, update, and implement a soil and water quality action plan for Fort Greely and Donnelly Training Area. The soil and water quality action plan will guide management actions for maintaining and improving soil and water quality as a result of unexploded ordnance and other potential contaminants. This plan is required to stay in compliance with the Safe Drinking Water Act, the Clean Water Act and the Sikes Act, which requires “no net loss” in the capability to support the military mission of Fort Greely and Donnelly Training Area. Updates of the soil and water quality management plan are required by Public Law 106-65 (Military Land Withdrawal Act) as mitigation for the land withdrawal LEIS and Public Law 86-797 (Sikes Act) every five years to implement the INRMP. Per Memorandum DAIM-ED-N, 21 March 1997, this component of the INRMP is a class 1 requirement.

Measures of Effectiveness:

- Complete, update, and maintain the soil and water quality management plan
- Effectively protect water quality while allowing military use.
- Involve the agencies in soil and water quality planning and the public in review.

Management History: The U.S. Army Cold Region Research and Engineering Laboratory began preliminary work to develop a soil and water quality sampling protocol during 2000. That pilot study was continued and additional sampling took place during 2001.

Current Management: Current management actions to update the soil and water quality management plan will cease in 2002. If this new INRMP is not approved and funded, no new soil and water quality management plan will be prepared, updated, or implemented. Policies already in place in the current soil and water quality management plan will continue.

Proposed Management:

Table 4-7. Soil and Water Quality Management Plan.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Conduct annual updates of the soil and water quality management action plan	USARAK Natural Resources	High	x	x	x	x	x
Prepare and update soil and water quality management action plan for the planning period of 2007-2011.	USARAK Natural Resources	High					x

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Complete NEPA documentation for update	USARAK Natural Resources	High					x

Other Management Alternatives Considered and Eliminated: There are no alternatives to maintaining a current Soil And Water Quality Management Plan in terms of updates at least every five years. NEPA documentation is also legally mandated.

4.2.3 Watershed Management Inventory and Monitoring

4.2.3.1 Soil and Water Quality Monitoring

Description and Justification: Monitor surface water quality, groundwater quality, and soil contaminants on Fort Greely and Donnelly Training Area. Groundwater, surface water, and soil monitoring will be conducted to evaluate the presence of contaminants from the impact areas. Soil and water quality monitoring evaluates water quality coming onto and leaving Fort Greely and Donnelly Training Area and identifies any potential contaminants leaving the impact areas. Monitoring water quality is important for measuring ecosystem health on Fort Greely and Donnelly Training Area. Land-based environmental degradation eventually affects water quality and aquatic ecosystems. Water quality monitoring is required to comply with the Clean Water Act and other environmental laws and regulations, as well as to formulate options for managing those species particularly dependent upon high water quality, as required by the Sikes Act and AR 200-3. Soil and water quality monitoring is required by Public Law 106-65 (Military Land Withdrawal Act) as mitigation for the land withdrawal LEIS and Public Law 86-797 (Sikes Act) every five years to implement the INRMP and are a class 1 requirement.

Groundwater monitoring is not a natural resources program within Army environmental management, but is listed in this INRMP to show the program is conducted on Fort Greely and Donnelly Training Area.

Management Areas: Management areas for soil and water quality monitoring focus on the Delta River, Delta Creek and Jarvis Creek. Surface water sampling locations will be concentrated on areas where these rivers and creeks enter the installation and leave the installation. Soil sampling will occur in these rivers and creeks at the edge of the impact areas.

Measures of Effectiveness:

- Annually monitor surface water as it enters and leaves Fort Greely and Donnelly Training Area to identify potential contaminants or potential contaminant migration.
- Monitor soils and sediments in streambeds along the Fort Greely and Donnelly Training Area border annually to identify potential contaminants or potential contaminant migration
- Participate with agencies in discussions of any contamination results.

Management History: There is no evidence surface waters on Fort Greely and Donnelly Training Area are significantly polluted, either from activities on the installation or in upstream areas off the installation. Therefore, there has been no regular monitoring of surface waters. In 1991-1992, the Army Environmental Health Agency (now the Center for Health and Preventative Medicine) sampled Bolio Lake and streams that flow through Fort Greely and Donnelly Training Area for munitions residues. The results were negative. CRTC has conducted further testing on Bolio Lake waters with similar results.

Over the years, several monitoring wells have been installed on Fort Greely and Donnelly Training Area in the cantonment area. The Corps of Engineers (COE) sampled at least 15 monitoring and drinking wells semi-annually through 1995. There are ongoing routine checks on drinking well water quality. Monitoring efforts indicate Fort Greely and Donnelly Training Area has had no significant contamination of groundwater.

Current Management: There is currently no monitoring of surface water on Fort Greely and Donnelly Training Area. USARAK is currently developing a monitoring protocol to evaluate soil and water quality. This project is currently funded through 2002.

Groundwater monitoring will continue in 2002-2006 as part of programs implemented by the ERD. The monitoring efforts indicate that there are no significant levels of groundwater contamination at Fort Greely and Donnelly Training Area. What little contamination that has been detected is at very low levels and is of no threat to human health. Groundwater levels in the wells are monitored each month, and extensive chemical testing is conducted on a quarterly basis.

Proposed Management:

Table 4-8. Soil and Water Quality Monitoring.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Complete development of monitoring protocol to evaluate soil and water quality and determine if there are contaminants in soil and surface and groundwater.	USARAK Compliance	High	x	x	x		
Monitor surface water and soils for potential contaminants.	USARAK Compliance	High			x	x	x
Continue to monitor existing wells for potential groundwater contamination.	USARAK Restoration	High	x	x	x	x	x

Other Management Alternatives Considered and Eliminated: There are no alternatives to conducting soil and water quality monitoring. Water quality monitoring is required to comply with the Clean Water Act and other environmental laws and regulations. It will help formulate options for managing those species particularly dependent upon high water quality, as required by the Sikes Act and AR 200-3. Soil and water quality is an important issue for the surrounding population. Monitoring groundwater on Fort Greely and Donnelly Training Area is a requirement of CERCLA.

4.2.3.2 Soils Planning Level Survey

Description and Justification: Conduct planning level soil survey on Fort Greely and Donnelly Training Area. Identify and map soils, correlate soils to permafrost areas, and establish relationships among terrain components. Fort Greely and Donnelly Training Area's soil survey is essential for establishing a database for planning effective management of withdrawn public lands. Soils data are required for input into the military training and scheduling process. The soils planning level survey is required by AR 200-3, supports compliance with the Clean Water Act, and is required to implement this INRMP as mandated by

Public Law 86-797 (Sikes Act). Per Memorandum DAIM-ED-N, 21 March 1997, this planning level survey is a class 1 requirement.

Measures of Effectiveness:

- Complete, maintain, and update a soils planning level survey on Fort Greely and Donnelly Training Area.
- Identify, locate, classify, and map soils on Fort Greely and Donnelly Training Area.

Management History: NRCS was contracted in 1998 to complete a soil survey of Fort Greely and Donnelly East Training Area. Black and white, infrared aerial photographs of Fort Greely and Donnelly Training Area were converted to digital, ortho-corrected data. NRCS used this data to delineate soils. Following delineation, the soil survey was assessed for accuracy through appropriate ground truthing methods. The final soil survey for Fort Greely and Donnelly East Training Area will be complete in 2001.

Current Management: NRCS was contracted to complete the soil survey of Donnelly West Training Area in 2000. The survey is expected to be finished in 2004.

Proposed Management: Under this preferred alternative, soil planning level surveys will be completed during 2002-2006. The 10-year update for soil planning level surveys on Fort Greely and Donnelly Training Area is projected for 2008.

Other Management Alternatives Considered and Eliminated: There are no alternatives to maintaining a current soils planning level survey. Per the Sikes Act, AR 200-3, and Memorandum DAIM-ED-N, 21 March 1997, this planning level survey must be updated every 10 years.

4.2.3.3 Floristic Planning Level Survey

Description and Justification: Conduct a floristic survey of Fort Greely and Donnelly Training Area. This project is the 10-year update to determine trends in floristic biodiversity and improve the quality of the floristic database. Floristic inventory activities set the foundation on which many decisions regarding land management are based. An accurate floristic planning level survey is required by AR 200-3, supports compliance with the Endangered Species Act, and is required to implement this INRMP as mandated by Public Law 86-797 (Sikes Act). Per Memorandum DAIM-ED-N, 21 March 1997, this planning level survey is a class 1 requirement.

Measures of Effectiveness:

- Complete, maintain and update flora planning level survey on Fort Greely and Donnelly Training Area.
- Complete, maintain, and update a threatened and endangered flora species survey.
- Identify the requirement for a floristics planning level survey in the EPR.

Management History: During 1997-1998, CRREL conducted a limited floristic inventory for USARAK at Fort Greely and Donnelly Training Area. The inventory focused on vascular plants; cryptogams (i.e. mosses and lichens) were not identified.

During 1995-1996, CRREL conducted a floristic inventory for USARAK at Fort Wainwright (Tande et al. 1996). The inventory focused on vascular plants, so cryptogams (i.e. mosses and lichens) were not identified. This inventory was the basis for the less intensive inventory at Fort Greely and Donnelly Training Area.

During 1997 and 1998 CRREL conducted a floristic inventory in conjunction with other work at Fort Greely and Donnelly Training Area, and collected 723 specimens. These collections represented 497 vascular plant taxa from 64 families and 198 genera. Eleven of these species represent significant range extensions (>150 km). CEMML laminated one full set of collected plants for use by the Fort Greely and Donnelly Training Area ITAM program. A mounted set was kept at the Fort Greely and Donnelly Training Area natural resources office, and an incomplete mounted set was kept by CRREL (Racine et al. 2001).

Current Management: An ongoing part of the LCTA program is the updating of the plant collection as new species are found. Otherwise, there are no ongoing actions regarding the floristic planning level survey.

Proposed Management:

Table 4-9. Floristics Planning Level Survey.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Update the floristic planning level survey.	USARAK Natural Resources	High					x

Other Management Alternatives Considered and Eliminated: There are no alternatives to maintaining a current floristic planning level survey. Per the Sikes Act, AR 200-3, and Memorandum DAIM-ED-N, 21 March 1997, this planning level survey must be updated every 10 years.

4.2.3.4 Vegetation Communities Planning Level Survey

Description and Justification: Conduct a 10-year update of vegetation communities planning level survey. The vegetation communities survey is conducted as part of an ecological land classification that synthesizes results from integrated resource studies to map ecologically sensitive portions of the landscape to facilitate land management and to minimize impacts to ecosystems. The project is designed to emphasize three aspects of ecosystem management on Fort Greely and Donnelly Training Area: the sensitivity and recovery of ecosystems to disturbance, permafrost distribution and relative stability, and the value of wildlife habitats. The identification of ecologically sensitive areas on Fort Greely and Donnelly Training Area and threats to these areas are critical to management of the entire installation. This project will directly support the military mission by identifying locations where special precautions should be taken during training and thus, by default, also identifying areas where special precautions need not necessarily be taken. An accurate vegetation communities planning level survey is required by AR 200-3, supports compliance with the Endangered Species Act, and is required to implement this INRMP as mandated by Public Law 86-797 (Sikes Act). Per Memorandum DAIM-ED-N, 21 March 1997, this planning level survey is a class 1 requirement..

Measures of Effectiveness:

- Complete, maintain, and update a vegetation communities planning level survey.
- Identify the requirement for a vegetative communities planning level survey in the EPR.
- Identify, locate, and map any rare or sensitive vegetation communities on Fort Greely and Donnelly Training Area.

- Characterize physical and thermal properties of permafrost, analyze relationships of permafrost with other terrain components, model permafrost distribution, and assess the response of permafrost to disturbance.
- Analyze Fort Greely and Donnelly Training Area for habitat use by passerines and small mammals, and rank them to diversity of wildlife species by relative value.

Management History: Field surveys for the ecological land classification were completed in FY 96. In 1998, ABR completed follow-up work on the expanded pilot study, which included verification of mapping accuracy and further field sampling in ecosystems not sampled adequately in 1996.

All of Fort Greely and Donnelly Training Area was mapped to three categories of ecosystem organization, ecotypes, ecosections, and ecodistricts. Combining associations of vegetative types and geomorphological classes creates ecotypes. Ecotypes are subgroups representing vegetation types or successional stages within a uniform soil and geomorphic class. Ecosections are areas with relatively uniform geomorphic features that have recurring patterns of soils and vegetation. Several vegetation classes may be included in an ecosection, but they are usually related because they occur as different stages in a successional sequence. Ecodistricts are broader areas with similar geology, geomorphology, and hydrology and are similar to physiographic units. The final map and report was completed in 1999 by ABR and published by CRREL in 2001. Survey data is stored in a digital format in the USARAK GIS.

Physical and thermal properties of permafrost was described at three sites within three geomorphic units (Abandoned Floodplain, Lowland Retransported Deposits, and Residual soils on north-facing slopes) for a total of nine locations. At each sample site, soil stratigraphy will be described from a pit (1-1.5 meters deep) or from cores (2-3 meters deep) obtained by a SEPARE corer. Stratigraphic descriptions will include soil texture (Soil Survey Staff, 1993) and ice structures (Shur and Jorgenson, in press). Samples were taken every 20-30 centimeters for determination of moisture and bulk density. Air and soil temperatures (5 centimeters depth) were collected at 30 locations (15 ecosystems x 2 replications) using small dataloggers (HoboTempsTm) equipped with thermistors. Temperature measurements were collected every 2 hours from 15 April 1998 to 1 October 1999. Snow surveys were conducted three times during winter (1998-1999) to measure snow depths at the soil temperature locations. At each monitoring site, soil samples will be taken from the various horizons (3-5) with the active layer (or top one meter) for analysis of moisture and bulk density. Soil characteristics were compared among ecosystems and geomorphic units (ABR, Inc. and Northern Land Use Research, Inc., 1998).

Results from analyses were used to develop parameters for a model of permafrost distribution using a model developed by Jorgenson and Kreig (1988) and modified by Wright et al. (1994) and applying spatial databases created by the Fort Greely and Donnelly Training Area Ecological Land Survey. Validity of the model was assessed by measuring presence or absence of permafrost at 50 locations accessible by the road system. The model was used to assess the response of permafrost to disturbance.

The use of habitats or ecosystems was analyzed in a two-tiered approach using data collected by the faunal surveys and from literature reviews. First, associations between habitats and passerines and small mammals were analyzed using field data obtained by faunal surveys. The specific analytical methods used depended on the amount of data collected for various species and habitat. Second, an overall index of habitat value was developed using habitat use information obtained from empirical analyses and from literature for a broader range of species. The synthesis and qualitative ranking of habitat values depended on sample sizes acquired for various species during faunal surveys and the completeness of habitat use information available from literature for each species. The final report was completed in 1999 (ABR, Inc. and Northern Land Use Research, Inc. 1998).

Current Management: There are no ongoing actions regarding the vegetation communities planning level survey.

Proposed Management:

Table 4-10. Vegetation Communities Planning Level Survey.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Update the vegetation communities planning level survey.	USARAK Natural Resources	High					x

Other Management Alternatives Considered and Eliminated: There are no alternatives to maintaining a current vegetation communities planning level survey. Per the Sikes Act, AR 200-3, and Memorandum DAIM-ED-N, 21 March 1997, this planning level survey must be updated every 10 years.

4.2.3.5 Topographical Planning Level Survey

Description and Justification: Conduct 10-year update of topographical planning level survey. An accurate topographical planning level survey is required by AR 200-3 and is required to implement this INRMP as mandated by Public Law 86-797 (Sikes Act). Per Memorandum DAIM-ED-N, 21 March 1997, this planning level survey is a class 1 requirement.

Measures of Effectiveness:

- Complete, maintain, and update a topography planning level survey.
- Identify the requirement for a topography planning level survey in the EPR.

Management History: A topographical planning level survey has not been completed for Fort Greely and Donnelly Training Area.

Current Management: There are no ongoing survey actions to update the topographical planning level survey.

Proposed Management:

Table 4-11. Topography Planning Level Survey.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Update the topography planning level survey.	USARAK Conservation	High				x	

Other Management Alternatives Considered and Eliminated: There are no alternatives to maintaining a current topographical planning level survey. Per the Sikes Act, AR 200-3, and Memorandum DAIM-ED-N, 21 March 1997, this planning level survey must be updated every 10 years.

4.2.3.6 Surface Water Planning Level Survey

Description and Justification: Conduct 10-year update of surface water planning level survey. An accurate surface water planning level survey is required by AR 200-3 and is required to implement this INRMP as mandated by Public Law 86-797 (Sikes Act). Per Memorandum DAIM-ED-N, 21 March 1997, this planning level survey is a class 1 requirement.

Measures of Effectiveness:

- Complete, maintain, and update a surface water planning level survey.
- Identify the requirement for a surface water planning level survey in the EPR.

Management History: A surface water planning level survey has not been completed for Fort Greely and Donnelly Training Area.

Current Management: There are no ongoing survey actions to update the surface water planning level survey.

Proposed Management:

Table 4-12. Surface Water Planning Level Survey.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Update the surface water planning level survey.	USARAK Conservation	High				x	

Other Management Alternatives Considered and Eliminated: There are no alternatives to maintaining a current surface water planning level survey. Per the Sikes Act, AR 200-3, and Memorandum DAIM-ED-N, 21 March 1997, this planning level survey must be updated every 10 years.

4.2.4 Watershed Management

Watershed management on Fort Greely and Donnelly Training Area consists of surface water management, groundwater management and erosion control. Groundwater management consists of restoration projects associated with individual sources of pollution, generally associated with the CERCLA “Superfund” designation. These projects are not classified as natural resources management and are not included within this INRMP.

4.2.4.1 Surface and Ground Water Quality Management

Description and Justification: Managing water quality on Fort Greely and Donnelly Training Area consists of developing best management practices designed to reduce chemical release from expended munitions in the impact areas. Activities such as moving targets away from open water and wetlands reduce the likelihood that potential releases may occur. Water quality management is required in order to stay in compliance with the Clean Water Act and the Sikes Act, which requires “no net loss” in the capability to support the military mission of Fort Greely and Donnelly Training Area. Conducting water quality management is required by Public Law 106-65 (Military Land Withdrawal Act) as mitigation for the land withdrawal LEIS and Public Law 86-797 (Sikes Act) to implement the INRMP.

Management Areas: The primary management areas for water quality management at Fort Greely and Donnelly Training Area are in the Oklahoma, Delta, Mississippi, and Washington Impact Areas, Delta River, Jarvis Creek, Delta Creek and Little Delta River, and along other riparian areas.

Measures of Effectiveness:

- Reduce the impacts of chemical release of munitions.
- Reduce the physical impacts of munitions on wetlands.

Management History: Cleanup operations have occurred annually in Oklahoma Impact Area by the Air Force since 1986.

Current Management: Continue cleanup of Oklahoma Impact Area. Continue the restriction on using white phosphorus munitions in wetlands.

Proposed Management:

Table 4-13. Surface and Ground Water Quality Management.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION				
			2002	2003	2004	2005	2006
Evaluate moving targets away from open water.	USARAK DPTSM	High			x	x	x
Consider using green ammunition.	USARAK DPTSM	High					x
Evaluate the use of ammunition lot numbers that have a low dud rate	USARAK DPTSM	High				x	

Other Management Alternatives Considered and Eliminated: There may be many other alternatives for cleaning up potential contaminants. USARAK will continue to consider new ideas, however, most methods of cleanup are cost prohibitive and can damage the environment worse than the potential contamination.

4.2.4.2 Erosion Control and Streambank Stabilization

Description and Justification: This project will control erosion and stabilize streambanks on Fort Greely and Donnelly Training Area. This project will correct active erosion sites near sensitive areas such as streams and wetlands. Projects are intended to complement the LRAM component of ITAM, not duplicate training area repair. A Fish Habitat Permit, from ADF&G Habitat Restoration division may be required for work conducted in or along streams and streambanks. Erosion control is required in order to stay in compliance with the Clean Water Act and the Sikes Act, which requires “no net loss” in the capability to support the military mission of Fort Greely and Donnelly Training Area. Conducting erosion control and streambank stabilization is required by Public Law 106-65 (Military Land Withdrawal Act) as mitigation for the land withdrawal LEIS and Public Law 86-797 (Sikes Act) to implement the INRMP

Erosion control is conducted as part of the LRAM program to the degree that it is associated with the maintenance and rehabilitation of training lands. However, erosion control is also associated with water pollution (environmental compliance) and road maintenance. Most erosion control not associated with LRAM on Fort Greely and Donnelly Training Area involves road drainage correction or maintenance. Road drainage maintenance is important for controlling sedimentation. Road maintenance on training lands is generally a responsibility of DPW. However, the 84th Combat Engineers also provide considerable road maintenance.

Management Areas: Management areas for LRAM and erosion control are the same. At Fort Greely and Donnelly Training Area, a rotational system of erosion control and LRAM will be used. East of the Delta River, erosion control and LRAM repairs will be focused on repair in Op and Greely training areas in 2003, Jarvis East and Jarvis North training areas in 2004, Ober and Donnelly training areas in 2005, and Butch and Granite training areas in 2006. Erosion and LRAM repair will be conducted as needed in Donnelly West Training Area (Figure 4-1).

Measures of Effectiveness:

- Repair a minimum of 20 acres of erosion sites per year on Fort Greely and Donnelly Training Area.
- Maintain or improve water quality.
- Land management operations are consistent with best management practices and ecosystem management
- Wetlands inventories/planning level surveys are used during the planning phase of all ground-disturbing projects.

Management History: The major access route throughout Bolio Training Area on Fort Greely and Donnelly Training Area was upgraded in 1999. Because of a drainage problem on the permafrost soils, Windy Ridge Road, a maneuver trail, was impassable during breakup and during wet times of the year. Since this was the primary access into and within Bolio Training Area, almost the entire training area was inaccessible. This project fixed the drainage problem and reduced erosion by installing diversion ditches, a culvert, and by regrading the road.

Current Management: Installation sources of dust, runoff, silt, and erosion debris are controlled to prevent damage to land, water and air resources, equipment, and facilities, including those on adjacent properties. A protective vegetative cover is maintained over all compatible areas. USARAK uses bio-engineered erosion control practices when possible including live plantings, root wads, coir logs, and spruce tree revetments to provide erosion protection and habitat for fish and wildlife. Other materials that are used for erosion control include gravel, fabrics, mulch, riprap, and recycled concrete and pavement that are environmentally safe and compatible with the site. When bare ground is required to accomplish mission objectives, other soil conservation measures are used to control dust, erosion, and sedimentation. Ongoing management actions include finishing erosion control projects funded in 2001 but not completed.

Physically intensive, land-disturbing activities are sited on the least erodable lands to minimize land maintenance expenditures and help ensure environmental compliance. The potential erodability of sites and the location of adjacent wetlands are identified and analyzed in all prepared plans for development, training, and other land uses. When roads are repaired, drainage problems are corrected. However, range road maintenance has a backlog due to budget cutbacks and higher priorities within the cantonment area. Thus, road drainage is often inadequate for proper distribution of runoff. Roads can be damaged in a short period of time, especially during spring breakup. Therefore, it is difficult to establish long-range priorities for correcting road erosion.

Proposed Management:

Table 4-14. Erosion Control and Streambank Stabilization Projects.

OBJECTIVE	RESPONSIBLE FOR IMPLEMENTATION	PRIORITY	IMPLEMENTATION
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			2002	2003	2004	2005	2006
Repair erosion sites along Jarvis Creek.	USARAK Natural Resources	High	x	x	x	x	x
ADF&G review of all streambank stabilization projects	USARAK Natural Resources	High	x	x	x	x	x
Obtain necessary NEPA, Section 106 and CWA Section 404 permits.	USARAK Natural Resources	High	x	x	x	x	x
Repair erosion control berm in Delta River by small arms ranges.	USARAK Natural Resources	High	x				
Revegetate burned areas in Training Area 22.	USARAK Natural Resources	High	x				
Repair erosion sites in Op Training Area.	USARAK Natural Resources	High		x			
Repair erosion sites in Greely Training Area	USARAK Natural Resources	High		x			
Repair erosion sites in Jarvis North Training Area.	USARAK Natural Resources	High			x		
Repair erosion sites in Jarvis East Training Area.	USARAK Natural Resources	High			x		
Repair erosion sites in Ober Training Area.	USARAK Natural Resources	High				x	
Repair erosion sites in Donnelly Training Area.	USARAK Natural Resources	High				x	
Repair erosion sites in Butch Training Area	USARAK Natural Resources	High					x
Repair erosion sites in Granite North Training Area	USARAK Natural Resources	High					x
Participate with the Delta River Flood Control Project	USARAK Natural Resources	High	x	x	x	x	x
Repair erosion (emplace culverts) in 33-Mile Loop maneuver corridor	USARAK Natural Resources	High	x	x	x	x	x

Other Management Alternatives Considered and Eliminated: There are many other potential sites for erosion control on Fort Greely and Donnelly Training Area. However, less than 10 percent of the total number of sites that are degraded can be fixed per year because of cost limitations. Repairing fewer than the number of site listed above can lead to poor water quality and may result in non-compliance, Notices of Violation, and fines. Repairing more than these sites per year would be cost-prohibitive.

4.2.5 Watershed Management Responsibilities

Watershed management on Fort Greely and Donnelly Training Area is the responsibility of USARAK. Within USARAK, DPW Environmental Department has primary responsibility to conduct watershed management. DPTSM also shares responsibilities to implement soil and water quality management through the LRAM program and through best management practices of the impact areas. US Army Corps of Engineers, under the Clean Water Act, is the primary regulator. The Environmental Protection Agency

also has regulatory responsibility under the Safe Drinking Water Act. ADEC also has responsibility for regulating soil and water quality.

USARAK recognizes that the release of contaminants into the environment and response actions to clean up those contaminants may result in adverse impacts to natural resources addressed in this INRMP. The Installation Restoration Program (IRP) is responsible for identifying such releases, considering risks and assessing impacts to the environment (including impacts to endangered species, migratory birds and biotic communities), and developing and selecting response actions when unacceptable risk to ecological receptors from the release is likely. The installation's natural resources management staff, in coordination with the USFWS and Alaska Department of Environmental Conservation, will identify potential impacts to natural resources caused by the release of contaminants and communicate those impacts to the IRP. Installation natural resources staff will also participate, as appropriate, in the IRP decision-making process to communicate natural resources issues, reviews and comments on documents (e.g., Remedial Investigation, Ecological Risk Assessment), and ensure that response actions, to the maximum extent practicable, are undertaken in a manner consistent with goals and objectives set forth in the INRMP.

The IRP will notify installation natural resources management staff of contaminant releases into the environment and invite such staff to participate in the decision-making process to ensure that impacts to natural resources are identified, considered, and addressed in the response process.

4.3 Minerals Management

4.3.1 Minerals Management Program Goals and Objectives

Minerals management goals and objectives are listed below:

- Manage the mineral resources on Fort Greely and Donnelly Training Area in the best interest of the public within the framework of the military mission
- Provide the military with a source of saleable construction materials for military construction purposes

4.3.2 Minerals Management Program Description

The BLM identifies three categories of mineral resources on federal lands.

Locatable minerals include most metals, metallic ores, and some non-metallic minerals. If the land is open to mineral location under the federal mining laws, private citizens may stake or “locate” a claim, perform assessment work, and develop the resource. Valid mining claims can result in private ownership of the mineral resource. The withdrawn areas have been closed to mineral location since the 1950s. There are no valid or existing claims within the withdrawals (Keill pers. com. 1998) (LEIS).

Leaseable minerals include oil, gas, coal, geothermal resources, oil, shale, gilsonite, phosphate, potassium, and sodium. These mineral resources are leased from the federal government for a period of time and do not become the developer’s property. The withdrawn areas have been closed to mineral leasing since the 1950s. There are no valid leases on withdrawn lands.

Saleable minerals consist basically of construction materials such as sand, gravel, riprap, cinders, pumice, clay, limestone, and dolomite. They are purchased outright from the federal government. Saleable materials on the withdrawals have been used locally by the Army and other authorized agencies, but have not been extracted commercially since the lands were first withdrawn in the 1950s.

4.3.3 Minerals Management Program Responsibilities

Mineral resources on public lands withdrawn for military purposes in Alaska are managed by BLM under federal regulations found in 45 CFR 3000. Sale and/or free use of mineral materials require NEPA review and USARAK concurrence. Unauthorized use of mineral materials is considered trespass and will be resolved jointly by the military and the BLM.

Figure 4-1. Erosion Control/LRAM Management Areas.